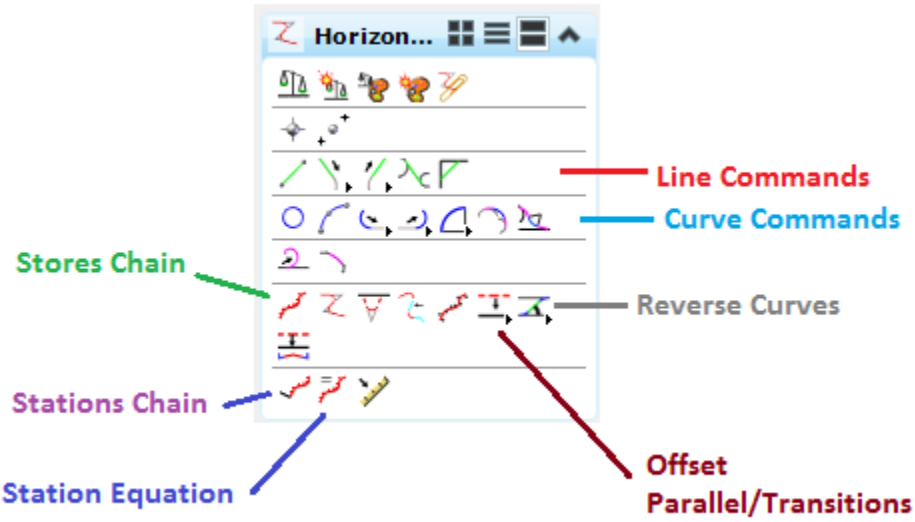
HORIZONTAL GEOMETRY (7-1-2013)

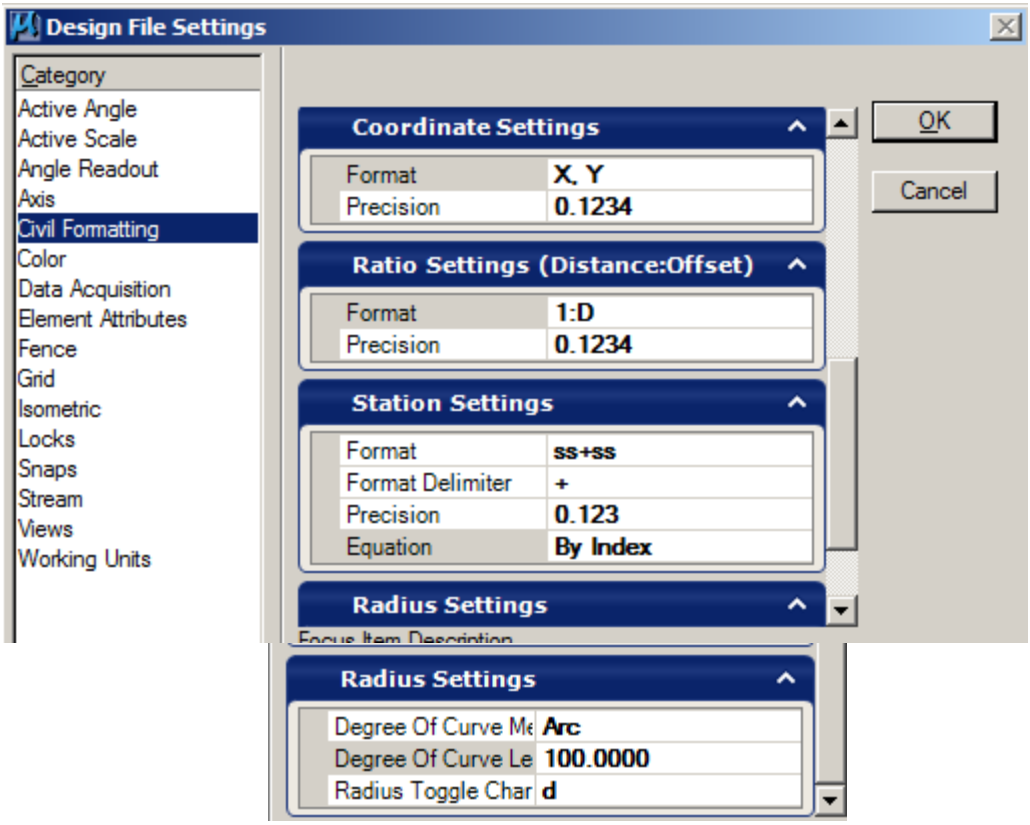


OVERVIEW

This is Bentley's new COGO application that stores elements in Microstation with the option of storing or not storing in the GPK. Since the GPK is still needed with older GeoPak applications, we have set this up to write to the GPK when the chain is stored. These tools have been implemented on the Road and Survey menus and although their use is optional, it is suggested to use them because of their ease of use and dynamic capabilities.

Some notes:

1. The tools are basically a combination of GeoPak's Horizontal Alignment Tools and Store Graphics and they work similar to the Horizontal Alignment commands. You construct your elements and then use a command to store the alignment.
2. **Stationing is displayed automatically when you store the elements as an alignment. Scale is based on the model properties scale. 1"=100' has been set in the Default Model in the Seed DGN files. Open the Model Dialog, right click the model, and choose properties to change the scale. You need to work in newly created DGN files for this to work correctly or change the Civil Formatting Design File Settings in existing DGN's as shown below (English settings) plus change model property scale to 1"=100'.**



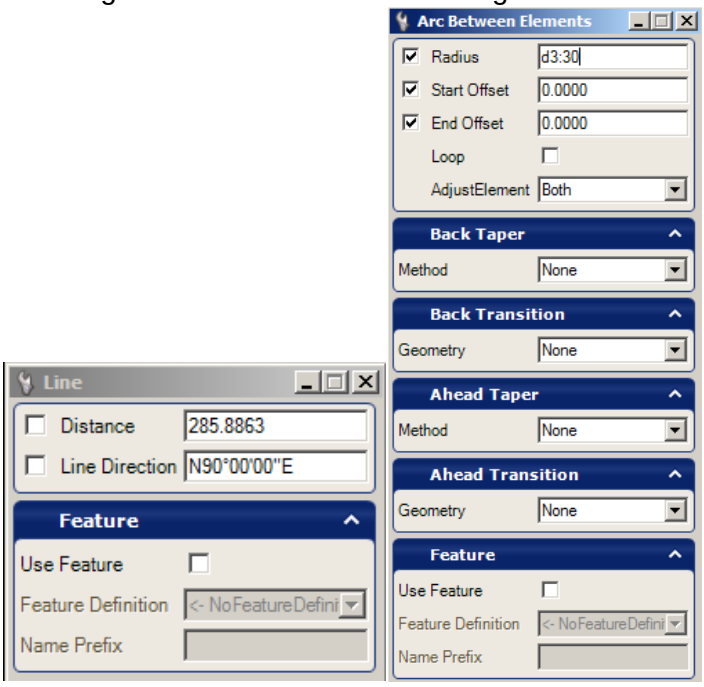
3. Any elements created with these tools are dynamic and linked together based on how you construct them. In other words, if you change the radius of an arc or extend the alignment using handlers, the chain in the GPK and stationing are automatically updated.
   GPK Graphical connection notes:

   a) If you delete stationing or curve data, there really is no way of getting it back other than plotting through D&C.
   b) To plot the alignment stationing at a different scale, you would create another DGN file and plot the alignment with D&C Manager or Import the alignment with the Model Properties scale set to the intended scale. See Importing Alignments section below. This process will change with future releases.
   c) If you move your ML alignment, alignments drawn off the ML with Civil Geometry tools are also adjusted.
   d) If you UNDO, elements undone in the DGN are also undone in the GPK.
   e) If you delete elements graphically, they are deleted in the GPK even if these are imported alignments.
   f) If you delete a chain in the GPK, the elements in the DGN file remain.
4. **I would create the file aligpk.dgn to store these alignments in so you know if these are deleted, they are deleted from the GPK and you'll easily know what DGN contains the alignments you'll graphically edit.**
5. You have the option to use these tools to place geometry and then use Store Graphics to store in the GPK.
6. No way to perform a Shift in the Alignment yet. No Best Fit is available yet either.
7. Tapers – GeoPak uses Straight line tapers even in curves but I think they are adding the ability to draw a true taper in a subsequent release.

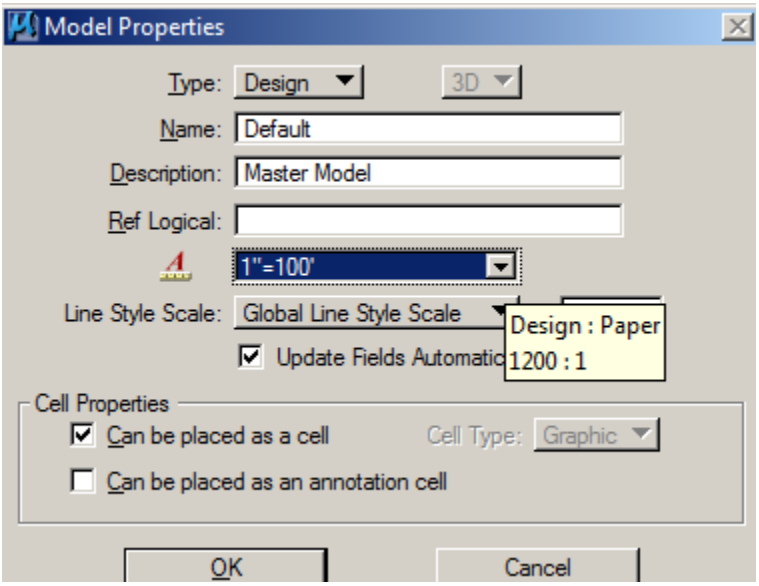
8. Import Geometry – You can import Alignments into a DGN file but there are no dependencies between lines/curves to edit graphically. This may change in subsequent versions.
9. OPEN COGO when you are about to store an alignment.
10. The Reverse Transition tool does not handle tangent to arc transitions too well so you may have to use the Horizontal Alignments Reverse Curve command in some cases.
11. The ability is there to copy parallel EP and shoulder off these alignments and these elements are dynamic also.
12. The 3PC Taper-Curve-Taper does not currently work with these elements because they are complex chains so plot the alignments in a separate DGN to work with Taper-Curve-Taper.
13. Single elements (i.e. 1 line for a local road) can't be stored as an alignment. Use Microstation's Break command & then store as 2 elements.
14. When you enter something in a Civil Geometry dialog, press the keyboard "tab" button to retain the value. After the command, values are reset so check values prior to the next command or to redo a command.
    CHAINS – Since we write to the GPK, there are some limitations as to what can be used as chain names. Points & Curves stored for the chain are the chain name with a numbered suffice added. Since Alphanumeric points should have an alpha prefix, rather than numeric prefix, chains stored through Civil Geometry should have an Alpha Prefix. Examples that work: (HWY471, SR1, etc.) Examples that do not work (HWY471REV, 49SR, etc.)

WORKFLOW

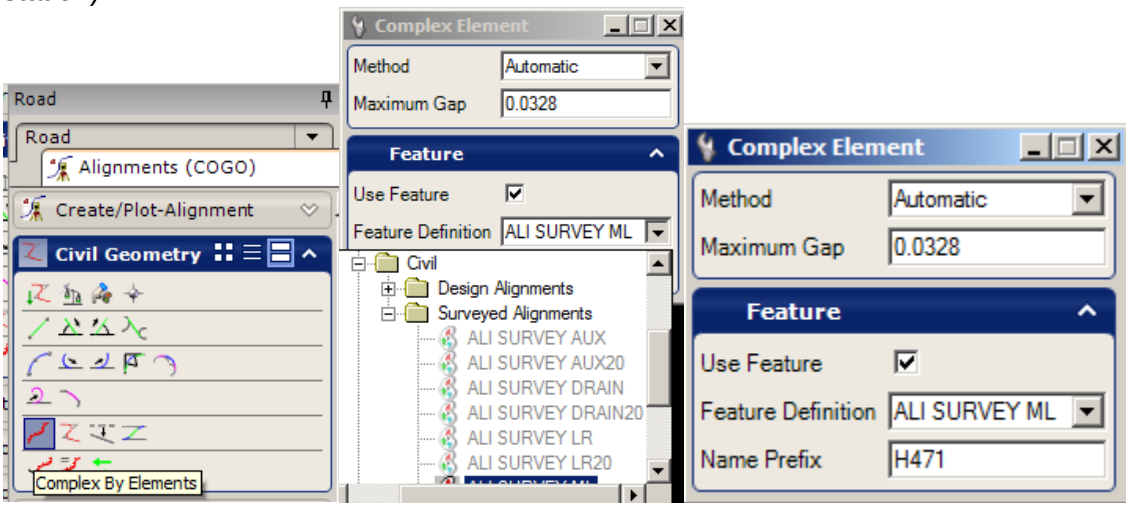
1. Create the elements of your alignment with the Line & Arc commands. <u>Don't assign a feature in these steps.</u> Degree's can be inserted in radius keyins as shown in the following Arc Between Elements dialog.



2. Go to model properties if you need to change your scale to something other than 1”=100’.

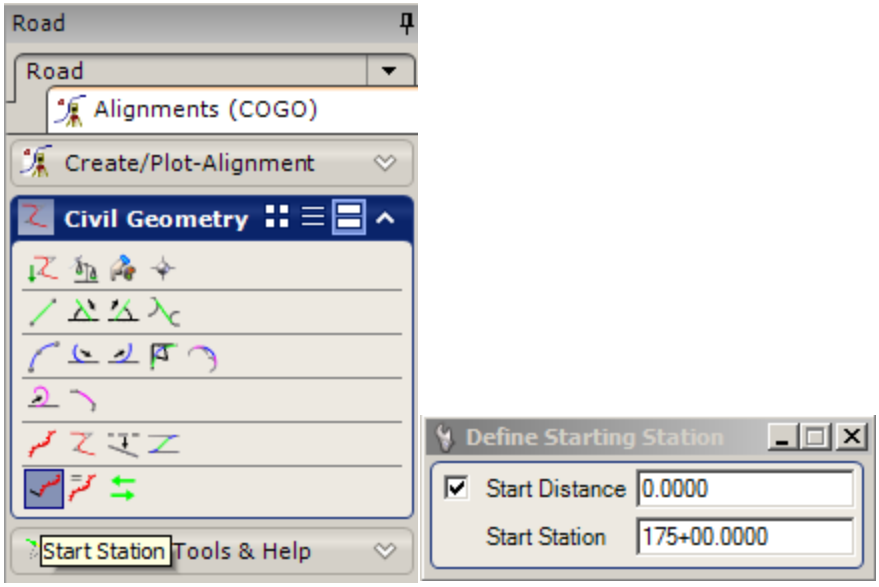


3. Choose the “Complex by Element” command to store the alignment. Choose the Feature Definition of the type of alignment you are storing and **enter your chain name in the “Name Prefix”.** Feature types are set up for 1”=100’ & 1”=20’ (20 at end of alignment type. If you need a scale other than these, choose 1”=100’ and only the PC/PT label lines would be affected. The chain is stored in the GPK & stationed (0+00 is beginning station).



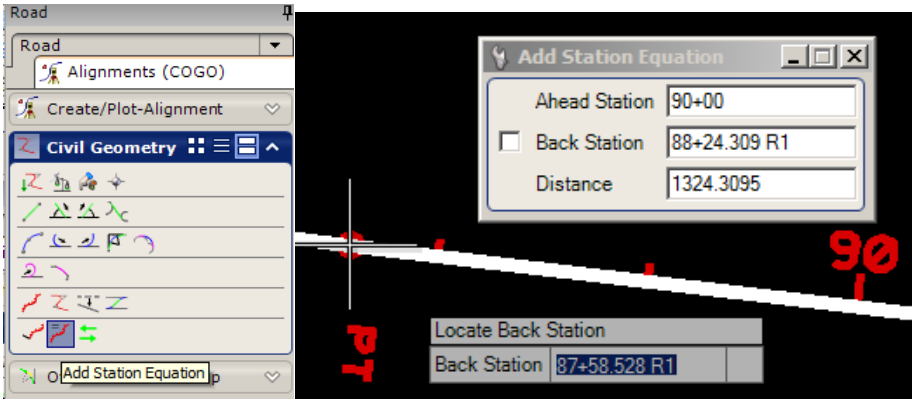
NOTE: Points & Curves stored for the chain are the chain name with a numbered suffice added. Since Alphanumeric points should have an alpha prefix, rather than numeric prefix, chains stored through Civil Geometry should have an Alpha Prefix. Examples that work: (HWY471, SR1, etc.) Examples that do not work (HWY471REV, 49SR, etc.)

4. Choose the “Start Station” to station the Alignment if the beginning station is not 0+00.

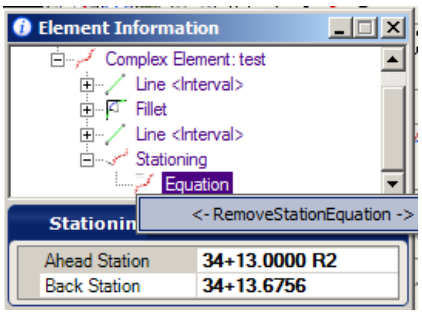


NOTE: Use the Start Station Command only once for an alignment. After that, you can edit the beginning stationing graphically.

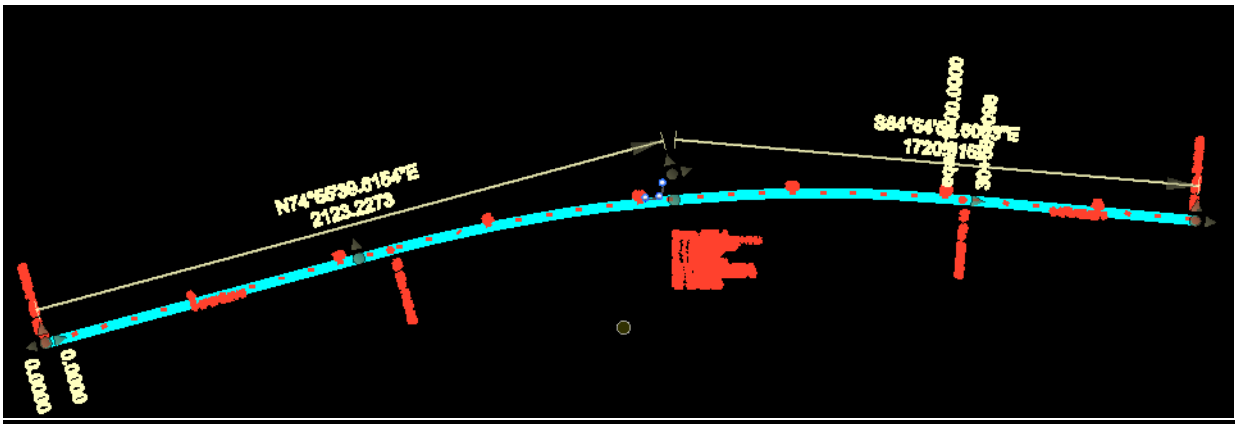
5. Store any equations from lowest station to highest station. If an equation is at the PT/PC, etc. you can uncheck the Back Station and Snap & DP to PC/PT's for the Back Station instead of keying it in.



To remove Station Equations, Select Alignment, Open Element Info, Right Click Equation.

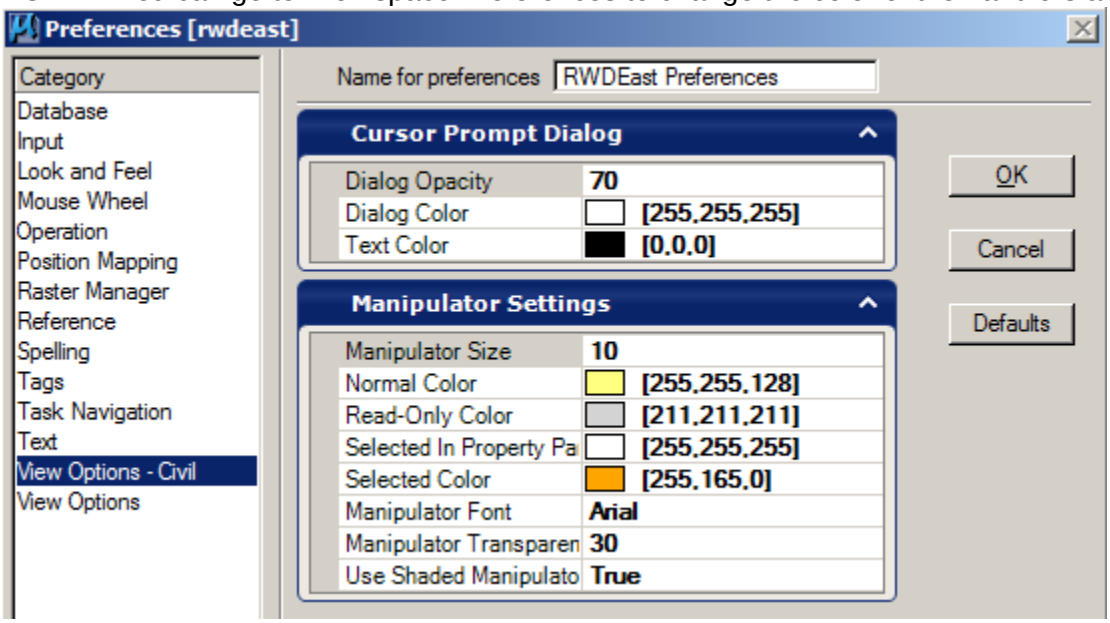


EDITING



1. Use Microstation's Element Selection tool to choose the alignment. You can then use handlers  to modify the alignment or edit any of the displayed text. Tag the circle handler on arcs to edit the radius.
2. You can make edits with Microstation's Element Info tool.
3. You may be prompted to choose the GPK where the alignment is stored.
4. The alignment is updated in the GPK when changes are accepted.

NOTE: You can go to Workspace Preferences to change the color of the handlers and text.

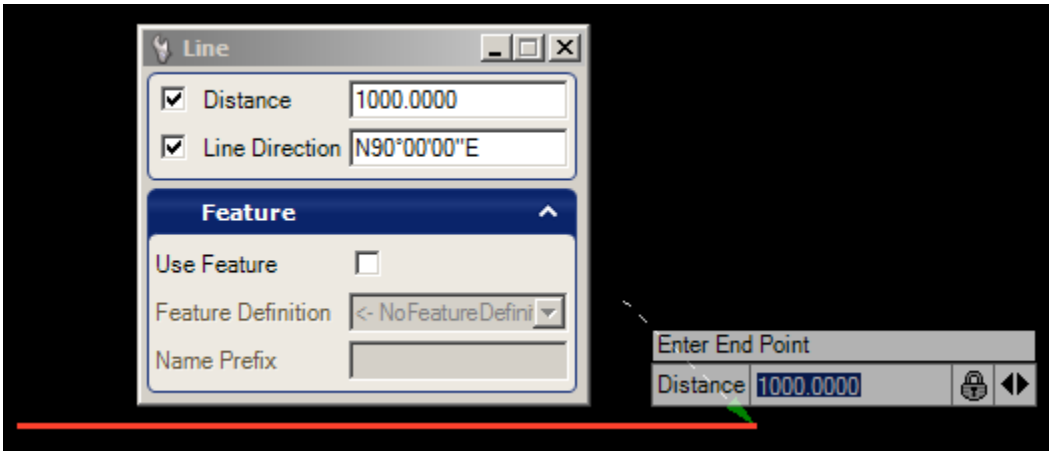


COMMANDS

You can enter info in the popup window by your cursor or the dialog but I find it easier to enter the data in the dialog and to lock (check) as many items as needed.

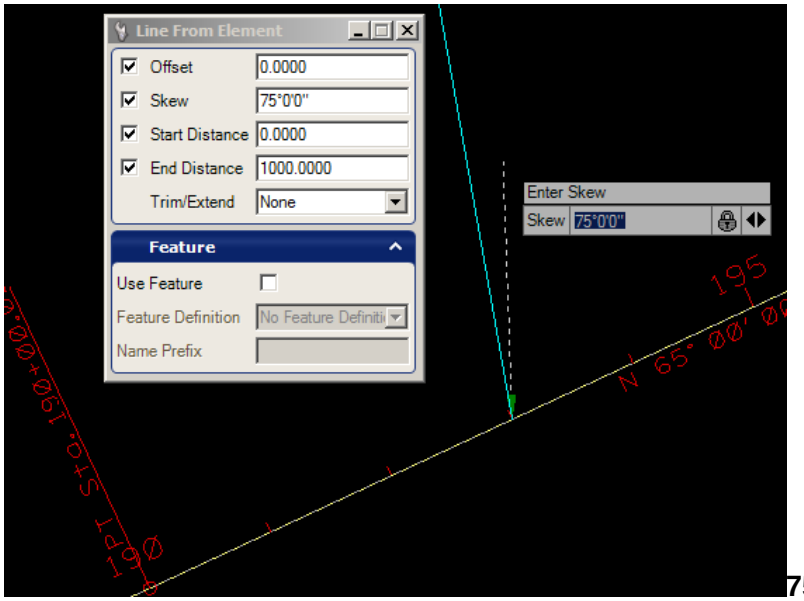
LINES

Place Line

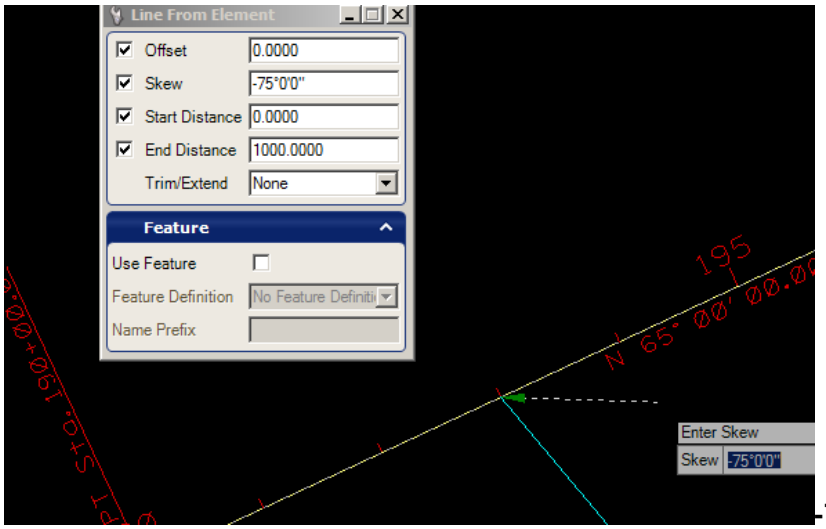


Line to Element

Note: Skew Angle is measured counterclockwise from the element in the direction it was created.

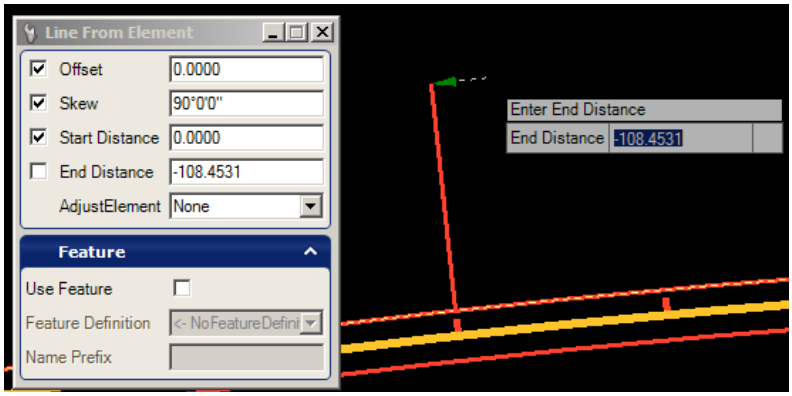


75 Degrees



-75 Degrees

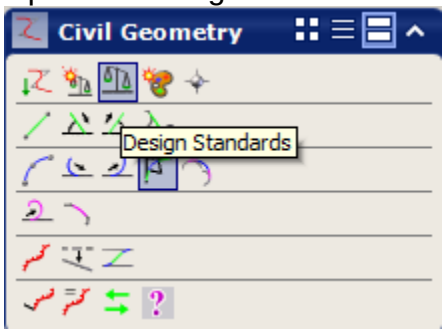
Line from Element



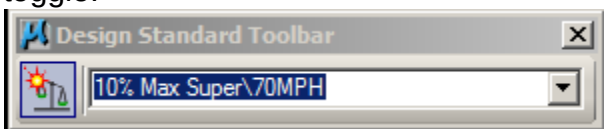
DESIGN VALUES

Default and Minimum RADII design values have been established and can be chosen for curve design.

1. Open the Design Standards button.

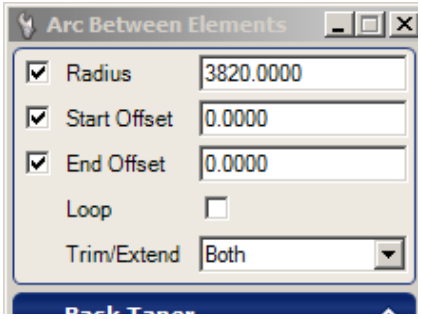


2. Choose the correct Design Speed and click the “Apply Design Standards” toggle.

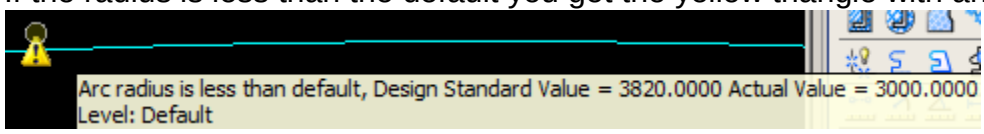


3. Choose the curve command you need.

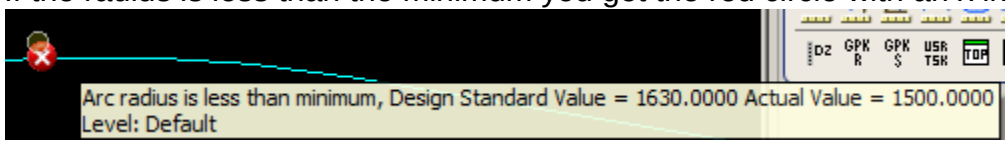
4. The default radius for that design speed is filled in automatically.



If the radius is less than the default you get the yellow triangle with an ! in it.



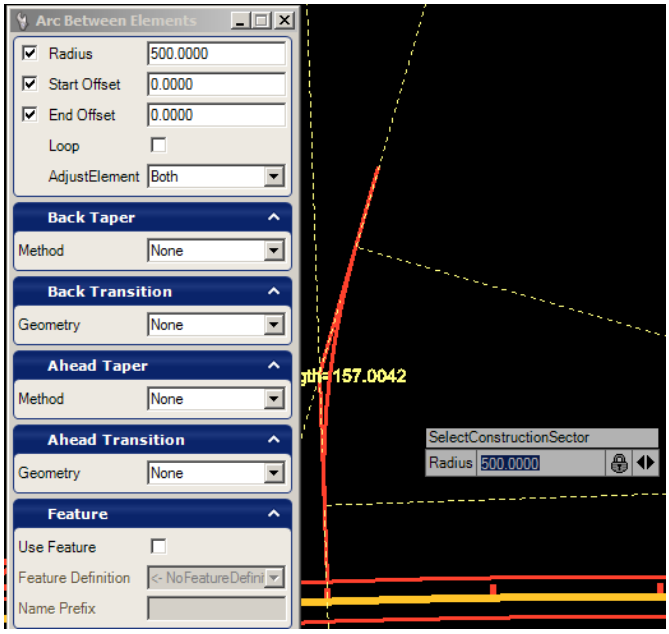
If the radius is less than the minimum you get the red circle with an x in it.



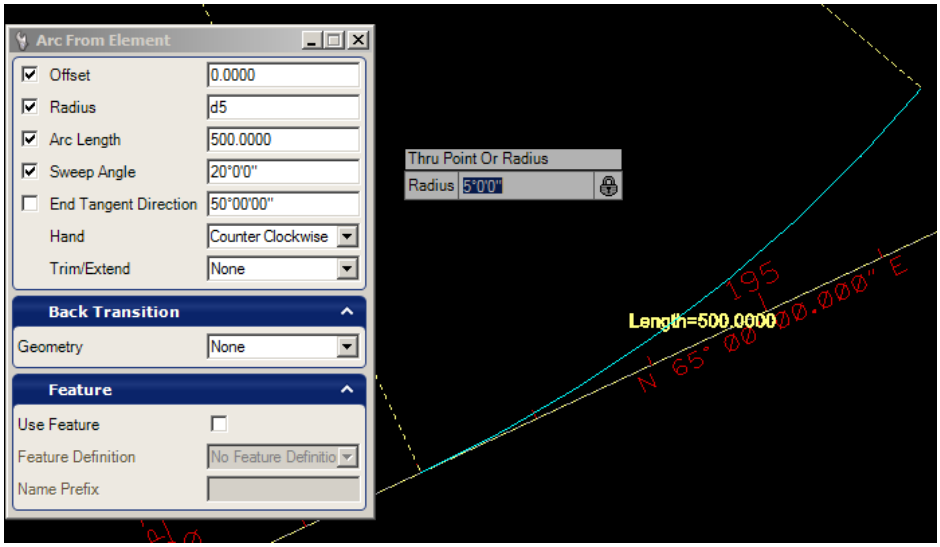
Neither one of these symbols show up on a plot.

ARCS

Arc Between Elements

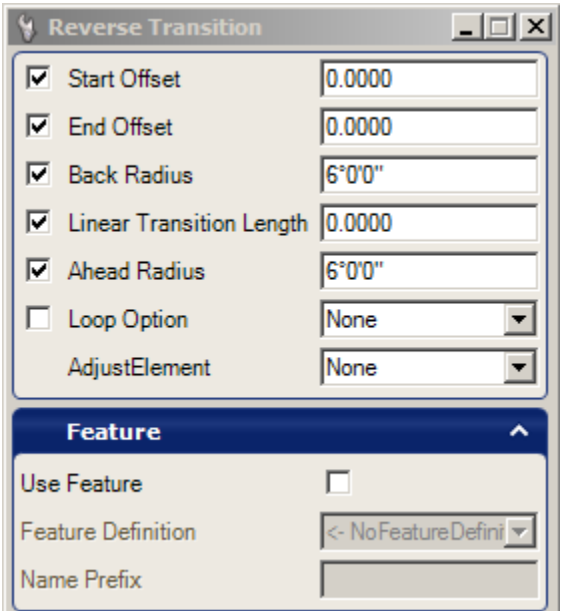


Arc from Element



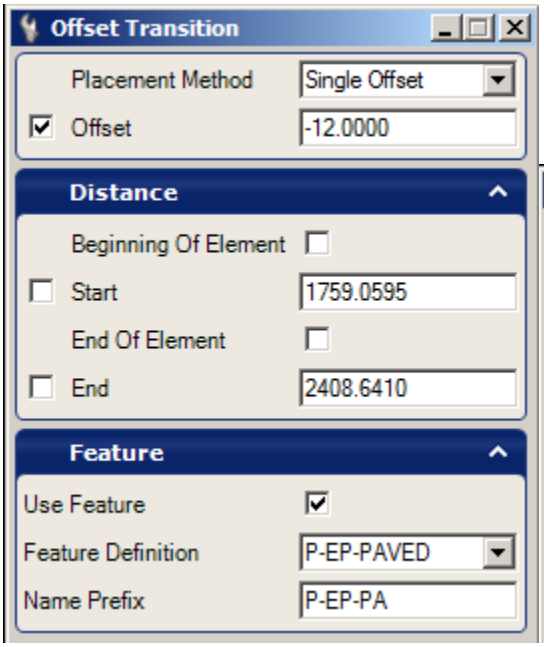
Note: Arc Sweep Angle is Curve Delta or Deflection

REVERSE CURVE

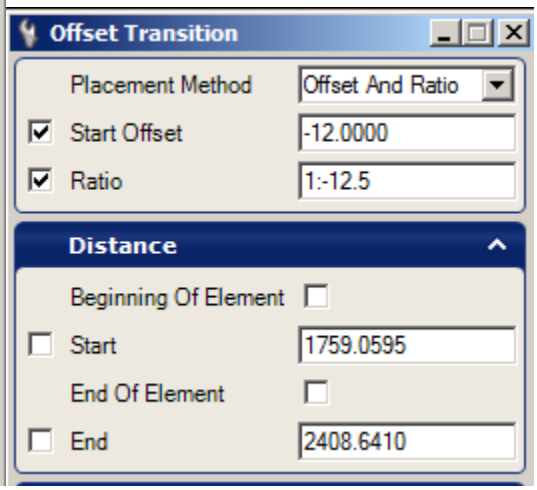


OFFSET TRANSITION

Offset



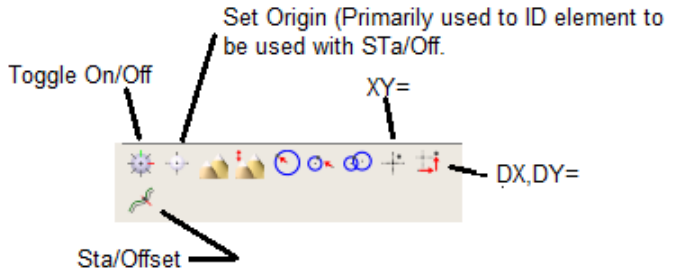
Taper



STORE/STATION ALIGNMENTS

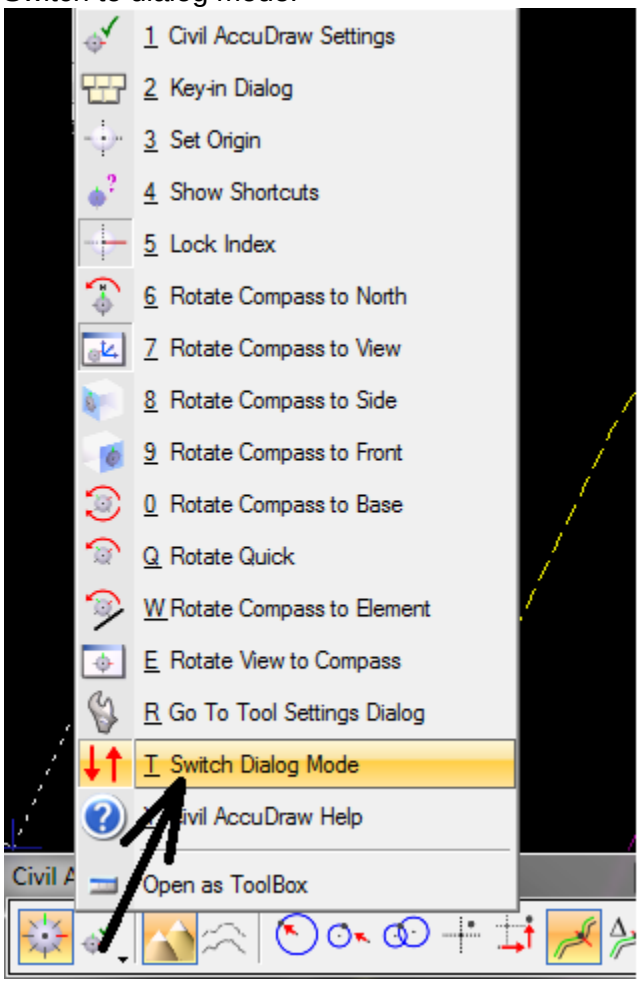
See Worflow

CIVIL ACCUDRAW

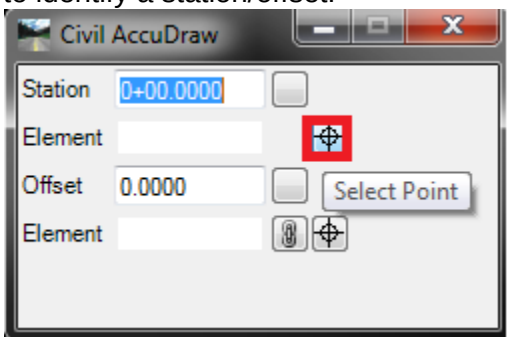


Used primarily to locate Station/Offset on a chain or element but can be also used to specify XY or DX DY values.

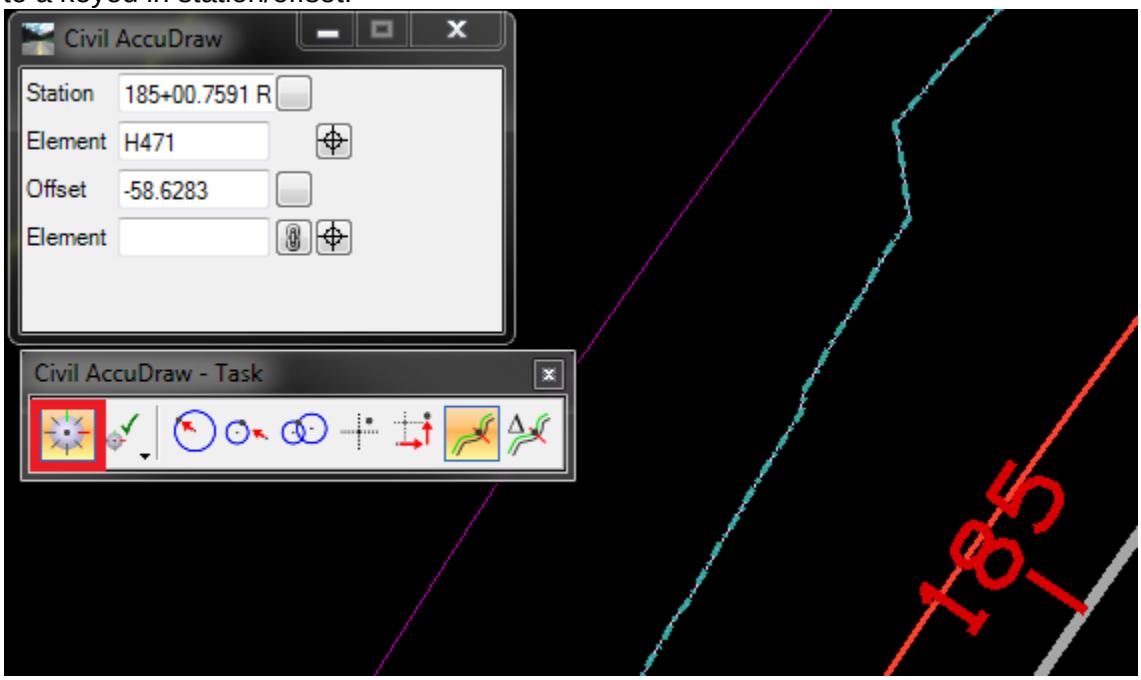
1. Switch to dialog mode:



2. On the Civil Accudraw dialog, choose the button below and choose the element you wish to identify a station/offset.



3. After the element is chosen (In this example chain h471), you can determine the station/offset of any point by just snapping or choose a command and apply that command to a keyed in station/offset.



4. Civil Accudraw works in profile views also, you just have to identify the view.